

What Is Claimed Is:

1. A device for operating a gas sensor (10), comprising a sensor chamber (14) which receives the gas to be analyzed via a diffusion barrier (15), comprising at least one pump cell (13) situated between the sensor chamber (14) and the gas to be analyzed, and comprising a measuring cell (19) situated between the sensor chamber (14) and the reference-gas space (17), in which an outer pump electrode (11) of the pump cell (13) exposed to the gas to be analyzed receives a pump current ( $I_p$ ) which is a function of a measuring voltage ( $U_{IPEactual}$ ) that is applied to a measuring electrode (18) situated in the reference-gas space (17), wherein a constant current source ( $U_+$ ,  $S_1$ ,  $U_-$ ,  $S_2$ ,  $R_i$ ) is provided for supplying the pump current ( $I_p$ ); the constant current source ( $U_+$ ,  $S_1$ ,  $U_-$ ,  $S_2$ ,  $R_i$ ) is settable to at least two amounts ( $I_+$ ,  $I_-$ ) of the pump current ( $I_p$ ); and/or the constant current source ( $U_+$ ,  $S_1$ ,  $U_-$ ,  $S_2$ ,  $R_i$ ) allows for an alternating operation with ON phases ( $T_D$ ) and OFF phases ( $T_A$ ), the duration of the ON phases ( $T_D$ ) and/or OFF phases ( $T_A$ ) being specifiable.

2. The device as recited in Claim 1, wherein the constant current source ( $U_+$ ,  $S_1$ ,  $U_-$ ,  $S_2$ ,  $R_i$ ) specifies a pump current ( $I_p$ ) having positive and negative polarity.

3. The device as recited in Claim 1 or 2, wherein an averaging over a predefined measuring time ( $T_M$ ) is provided for determining the average pump current ( $I_p$ ).

4. The device as recited in Claim 3, wherein given a fixed amount ( $I_+$ ,  $I_-$ ) of the pump current ( $I_p$ ) and a predefined duration of the ON phase ( $T_D$ )/OFF

phase (TA), the number of ON durations (TD)/OFF durations (TA) is predefined.

5. The device as recited in one of the preceding claims, wherein the measuring voltage (UIPEactual) is recorded during the OFF phases (TA).

6. The device as recited in one of the preceding claims, wherein the constant current source (U+, S1, U-, S2, Ri) is controlled as a function of a differential signal (24) that controls a comparator (23) as a function of the difference between the measuring voltage (UIPEactual, UIPEactuald) and the setpoint voltage (UIPEsetpoint).

7. The device as recited in one of the preceding claims, wherein a plurality of pump cells (13) is provided in the gas sensor (10), and each outer electrode (11) of the pump cells (13) receives a pump current (Ip).

8. The device as recited in one of the preceding claims, wherein air is present in the reference-gas space (17) of the gas sensor (10).

9. The device as recited in Claim 8, wherein the setpoint voltage (UIPEsetpoint) is set to a value of 300 mV - 700 mV.

10. The device as recited in Claim 1, wherein the gas sensor (10) is in the form of an exhaust-gas sensor, and the outer pump electrode (11) as well as the diffusion barrier (15) are exposed to the exhaust gas.